
ABSTRACT

A combination of frequency and time division multiplexed signals communicates using bursts of higher frequency sinusoidal waves superimposed upon the alternating current in a two-wire power distribution network. A synchronization pattern precedes data, all bursts having the same frequency to overcome problems caused by varying reactances, and all bursts being confined within negative half-cycles of the AC power. Such networks minimize the amount of wire needed to connect large numbers of devices to a common controller while covering large distances, and requiring no particular connection pattern or terminations, whether near the surface, above ground, or in deep earth wells. In an irrigation system they accommodate at once solenoid valves and distributed environmental sensors. Landscape changes that would otherwise require new wiring to accommodate new irrigation zones are facilitated by merely tapping into the two-wire communications lines at the nearest accessible point. Outdoor lighting controls and security sensors are easily accommodated.